

REMARKS/ARGUMENTS

These remarks are made in response to the Final Office Action of March 06, 2006 (hereinafter "Office Action"). This response is filed within the 3-month shortened statutory period. This response is filed as a Request for Continued Examination in response to a final office action to ensure that amendments contained herein will be considered.

In paragraphs 4-5 of the Office Action, claims 1, 3-5, and 22 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,853,988 to Dickinson, *et al.* (hereinafter "Dickinson") in view of U.S. Publication No. 2003/0163718 to Johnson, *et al.* (hereinafter "Johnson").

In paragraph 6, claims 2 and 11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickinson in view of Johnson in further view of U.S. Publication Number 2001/0042143 to Ooba, *et al.* (hereinafter "Ooba").

In paragraph 7, claims 6, 8-9, 12-17, and 19-21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickinson in view of Johnson and in further view of Ooba and U.S. Publication Number 2002/0136406 to Fitzhardinge.

In paragraph 8, claims 7, 10, and 18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickinson in view of Johnson and in further view of Ooba, Fitzhardinge, and U.S. Patent Number 6,249,866 to Brundrett, *et al.* (hereinafter "Brundrett").

Applicants have amended independent claims 1, 9, and 22 to clarify that said original data set is able to be reassembled from the granular portions by concatenating retrieved granular portions to one another in an original order relative to each other. This amendment is supported by paragraphs 0023, 0027, 0061, and throughout the application. No new matter has been added.

A. Applicants' Invention Antedates Cited References

Applicants respectfully assert that, independent of the fact that the claims as amended define over the prior art, Applicants' invention predates Johnson. In support of their

contention, Applicants herewith submit their Declarations along with evidence of activity on specific dates establishing conception and continuing diligence from a time prior to the effective date of both references.

The Declarations are accompanied by a copy of the Applicants' Confidential Invention Disclosure No. BOC8-2001-0022 (hereinafter "Disclosure") entitled "Distributed Storage of Granular Relation Elements from Within an RDBMS." The Disclosure demonstrates proof of conception for the claimed subject matter of the Applicants' invention at least as early as March 13, 2001, which predates the April 12, 2001 effective date of Johnson.

The Disclosure is an International Business Machines Corporation (hereinafter "IBM") confidential disclosure form, which is a standardized document utilized by IBM and submitted by its inventors upon conception of an invention. IBM has established internal procedures governing the use of such confidential disclosure forms. The procedures preclude substantive modifications to a disclosure form subsequent to its submission to an IBM Attorney/Patent Professional. Instead, any changes and/or additions are appended as an attachment to an IBM confidential disclosure form together with the date the attachment was added.

The present application, including each claim, was prepared based upon Applicants' Disclosure. Moreover, according to IBM's established procedures governing the use of such disclosures, the inventors reviewed the application prior to its submission to the U.S. Patent and Trademark Office so as to insure that the claims and material contained therein were fully supported by the Disclosure. Each of the claims in the application are fully supported in the Disclosure.

Applicants further exercised due diligence from prior to the effective date of Johnson to March 1, 2002, the date the present application was filed. With respect to Applicants' diligence, it is to be noted that, as set forth in the Declarations, once an IBM disclosure form is completed, the disclosure is reviewed by an internal Invention Review Board (hereinafter

“The Board”) within IBM to determine whether to prepare an application based upon the submitted disclosure. Upon the Board’s reaching a decision to prepare an application, outside counsel is selected to prepare the application, and instructions in this regard, together with the IBM invention disclosure form, are conveyed to the outside counsel. Outside counsel prepares a draft of the application that is iteratively reviewed by each inventor until such time that the inventors are satisfied that the application sufficiently details the inventive concepts described in the Disclosure.

The period between March 13, 2001 and March 1, 2002, was a time in which the Board reviewed the Disclosure (March 16, 2001), requested an initial novelty search (April 2, 2001), received the final search results (April 27, 2001), reached a final decision to proceed with filing of the instant application (April 30, 2001) and assigned the application to outside counsel, and outside counsel drafted the present application. Further to the date outside counsel was assigned the task of preparing the present application, outside counsel iteratively reviewed and revised the draft application with the inventors until it was finalized in its submitted form. This activity (reviewing a patent application) during the period noted above is believed to satisfy the legal requirements for a showing of diligence. See, e.g., MPEP 7 15.07(a).

Outside counsel prepares cases on a “first come, first served” basis, where applications associated with bar dates are granted priority within the work queue. This is a common practice in the industry followed by most if not all patent practitioners and is a practice that comports with the expectations of most if not all entities having substantial patent portfolios, such as IBM.

Applicants believe that the evidence clearly establishes reasonable diligence from a time prior to the effective date of Johnson to the filing date of the present Application and that diligence was exercised in constructively reducing the invention to practice between the date of the Disclosure, until the filing date of the present Application.

B. The Cited References taken in Combination Fail to Explicitly or Implicitly Teach Each Claimed Limitation

Claims 1-22 have all been rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickinson in view of Johnson (claims 2 and 6-21 have been rejected in view of Dickinson in view of Johnson, and in view of one or more additional references). The Applicants' claimed invention, Dickinson, and Johnson shall be briefly reviewed.

I. Applicants Claimed Invention

Each of the claims 1-22 includes limitations where a data set is separated into multiple granular portions of data, where different granular portions of data are stored in different data stores. Each granular portion of data is to contain only non-sensitive data, while the full data set contains sensitive data. That is, each granular portion represents a portion of the whole data set and each granular portion explicitly has a smaller bit size than the data set. The data set is able to be reassembled from the granular portions by concatenating retrieved granular portions to one another in an original order.

Decomposing a data set into different granular portions that are stored upon separate drives in an array increases information security because an unauthorized user must obtain granular portions of data (that do not contain sensitive data) from more than one data source and properly combine the data to form the original data set (that does contain sensitive data). Appreciably, the required amount of total storage space across the data stores is approximately equivalent to an amount of storage space required to store the data set sequentially on a single drive in a conventional fashion. A slight increase in needed space can be attributed to a need to store indexing information to recombine the granular portions to form the original data set.

For example (see paragraph 0027), a string data type including a social security number "123-45-6789" can be separated into four granular portions ("123"; "45"; "67", and "89") each of which can be placed in a separate data store. Metadata (FIG. 2B) can be used to recombine the granular portions. From paragraph 0059, "the size of the elements in bits

(i.e. the level of granularity) should be sufficiently small to ensure that elements in a queue or any portion thereof do not have any sensitive or useful informational context.”

II. Dickinson's Invention

Dickinson teaches that two or more ciphers (A and C) are to be automatically generated for an original cryptographic key (S). A is combined with S to generate partial key B (using $A \text{ XOR } S$). C is combined with S to generate partial key D (using $C \text{ XOR } S$). Notably, A, B, C, D and S are presumed to have the same number of bits. In order to re-obtain (assemble) the original cryptographic key (S), at least two of A, B, C, and D are needed (specifically A and B or C and D are needed). Pairs of partial keys can be stored in different data stores such that none of the stored pairings are able to be recombined to form S as noted at column 17, lines 25-30.

Dickinson is effectively teaching a method for generating multiple cryptography keys from an original key, where each of the multiple keys is approximately the size of the original key. Each of the multiple keys is stored in a separate data store. Decrypting the multiple keys to ascertain the original key requires at least two of the multiple keys. A storage space required for Dickinson's invention to function is approximately equal to twice (for two keys), three times (for three keys), and so forth of the original space needed to store an original cryptography key. Additionally, Dickinson requires stored meta data concerning the location of the multiple keys to track which of the multiple keys are related. Since Dickinson only is concerned with storing cryptography keys, the additional required storage space is not a strong concern, which would not be the case if Dickinson's invention was used to store data content in quantity (as is the Applicants' invention).

Dickson further teaches that more of the multiple keys can be generated than is necessary to ascertain the original key. This can provide redundancy. For example, multiple keys A, B, C, and D can be generated from original cryptography key K. Any combination of two of the multiple keys can be used to re-generate key K. Each of the multiple keys can

be stored in separate data stores. That way, any two of the four stores can be inoperative at any time without affecting the functionality of the system (*see* column 16, lines 23-49).

III. Johnson's Invention

Johnson details storing data in a single data store in a pseudorandom fashion for data security reasons. Johnson performs this by mapping virtual memory addresses against randomly or pseudo randomly selected actual addresses. Johnson fails to provide teachings or suggestions regarding multiple data stores and/or decomposing data sets having sensitive data into granular portions not containing sensitive data. Johnson is not concerned with data content of a data set being stored or about a level of granularity specific to that content that would prevent sensitive information from being obtained. Instead, Johnson teaches a tool for mapping addresses in a single storage space in a pseudo random and content agnostic fashion.

C. Improper Motivation to Combine References

The Examiner states that Dickinson does not explicitly state that each granular portion of data has a smaller bit size than the original data set. Johnson is combined with Dickinson to correct this deficiency. Hence, Dickinson is being modified by Johnson to result in a solution where data is decomposed into granular portions having a smaller bit size than the original data set. Further, as per the current amendment, the claimed invention explicitly states that the original data set is able to be reassembled from the granular portions by concatenating retrieved granular portions to one another in an original order relative to each other.

According to MPEP 2143.01, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

The intended purpose of Dickinson is to generate multiple keys from an original key and store them in multiple data stores. The multiple keys are to be formed so that a subset of

keys can be used to regenerate the original key, thereby permitting Dickinson's system to function if one or more of the data stores is inoperative. Applicants explicitly claim that an original data set can be reassembled by concatenating the granular portions in an original order. Modifying Dickinson in this manner, would not permit "extra" keys for redundancy of operation, which is an explicitly stated purpose and function of Dickinson's invention (column 16, lines 23-59).

Accordingly, since the proposed modification of Dickinson would render the prior art invention being modified unsatisfactory for its intended purpose, there is no suggestion or motivation to make the proposed modification. On this basis, Dickinson and Johnson should not be combined for purposes of a 35 U.S.C. § 103(a) rejection, and the rejections of claims 1-22 should be withdrawn, which action is respectfully requested.

MPEP 2143.01 also states that a proposed modification cannot change the principle of operation of a reference. The principle of operation of Dickinson is to generate multiple keys from an original key using bitwise XOR operations, as noted by column 16, line 60 to column 18, line 35. Applicants explicitly claim that granular portions (which are supposed to be analogous to Dickinson's multiple keys) each have a smaller bit size than an associated data set. Further, the granular portions can be concatenated in their original order to form the original data set. This is significantly different and directly opposed to the principle of operation of Dickinson's derived keys. On this basis, Dickinson cannot be modified by Johnson in the manner suggested without changing the principle of operation of Dickinson. Accordingly, Dickinson and Johnson should not be combined for purposes of a 35 U.S.C. § 103(a) rejection of the Applicants' claims, and the rejections of claims 1-22 should be withdrawn, which action is respectfully requested.

D. Summary

Applicants have shown that the claimed invention antedates Johnson, thereby rendering Johnson an improper reference. Since Johnson is relied upon in the 35 U.S.C. § 103(a) rejections of claims 1-22, the Applicants' invention should be in an allowable state.

Additionally, Applicants have shown that it is improper to modify Dickinson with any other reference for purposes of rejecting the Applicants' claimed invention under 35 U.S.C. § 103(a), since any such modification of Dickinson would render Dickinson unsatisfactory for its intended purpose and would change the principle of operation of Dickinson. Hence in accordance with MPEP 2143.01, Dickinson should not be combined with any other art reference for purposes of rejecting the present application under 35 U.S.C. § 103(a).

Other cited references (Fitzhardinge, Brundrett, and Ooba) fail to cure the deficiencies noted above. Further, Fitzhardinge has an effective date of March 20, 2001, which the Applicants' invention antedates (having an effective date of at least as early as March 13, 2001).

Since each claimed limitation is not explicitly or implicitly taught by any properly cited reference or combination of the proper references (Dickenson, Johnson, Fitzhardinge, Brundrett, and/or Ooba), Applicants respectfully request that the 35 U.S.C. § 103(a) rejections to claims 1-22 be withdrawn. The Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. The Applicants request that the Examiner call the undersigned **(305-761-1972)** if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Brian K. Buchheit", with a long horizontal flourish extending to the right.

Date: 06 June 2006

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